Summaries

UDC 549.322.21

Onufrienok V.V.
THE IMPACT OF IMPURITY ATOMS ON CATION VACANCY DENSITY (BY THE EXAMPLE OF PYRRHOTITE OF PANIMBA DEPOSIT)

The author has studied the features of interaction between impurity atoms and cation vacancies in pyrrhotite structure of «Panimba» deposit. Based on the analysis of electron structure of the cation vacancies in NiAs type crystal structure the correlation of density of the impurity atoms and the cation vacancies in pyrrhotite structure –the growth in density of the cation vacancies at the increase of total density of the impurity atoms, was proved. The decrease of vacansion interaction energy, as a result of vacancy electron capture by the impurity atoms, is the reason of this dependence. The author has proposed the explanation of the nature of introducing the impurity bivalent atoms (cobalt, nickel etc.) into the structure. The atoms are similar to a large extent in the electron structure and ionic radii with ions of base crystal matrix of pyrrhotite. Based on the carried out calculations of antimony impurity density the properties of anionic impurity atoms were studied and their isomorphic substitution of sulphur ions was analyzed. It was shown that the nature of this phenomenon is the capture of cation vacancy electron by the impurity atom for covalent bond saturation.

UDC 551.72:561.2(1–925.73)

Stanevich A.M., Kornilova T.A., Maksimova E.N., Gladkochub D.P., Lingsen Zeng
PALEOCOENOSIS OF THE NEO-PRATEROZOIC IN NORTHEAST OF CHINA (LIAOTUNG PENINSULA)

For the first time the microfossils from Wangjiatan formation in the northeast of China were obtained and studied. Various organo-walls forms of acritarchs and cyanobacteriae were described. Their habitat and disposal area were reconstructed. Among the acritarchs the morphological groups were singled out. The groups have been preliminary correlated with large taxa of the plant world: brown and green algae. The Wangjiatan formation can be referred to the upper layers of the Upper Riphean on a number of forms (*Kirbia multipartita* Mikh. et Volk.).

UDC 550.837

Erofeev L.Ya., Orekhov A.N.
DETERMINATION OF GENESIS AND TECTONIC STRUCTURE OF INTRUSIVE BODIES BY THEIR MAGNETISM

The authors have determined the opportunities to use magnetic measurements for studying the genesis of the intrusive bodies and their tectonics. The article describes the implementation of these opportunities and introduces case studies.

UDC 622.276.5.001.42: 519.688

Gavrilov K.S., Sergeev V.L.
DIAGNOSTIC TECHNIQUE FOR RADIAL FLOW WHEN INTERPRETING NONSTATIONARY HYDRODYNAMIC ANALYSIS OF OIL WELLS

The article considers the issue of determining a radial flow starting time when processing the data of oil well hydrodynamic analysis by a pressure recovery curve. The authors have proposed the method for its solution based on the adaptive interpretation technique considering the a-priori information. The examples of interpretation of the pressure recovery curve for uniform-porous oil reservoirs with radial flow diagnostics are introduced.

UDC 550.823

Nguen Hyu Bin
GEOPHYSICAL RESEARCHES OF WELLS WHEN INVESTIGATING MAGMATIC RESERVOIRS OF THE WHITE TIGER DEPOSIT

The article introduces the features and the results of data interpretation of the lithology and porosity examination techniques (acoustic, gamma-gamma, neutron-neutron and spectral gamma logs) and fracture studying methods (electric and acoustic scanners FMI/DSI) when estimating crystal base oil reservoirs on the White Tiger deposit (Central crest). Porosity (cavitation), permeability and morphological characteristics of fractures are the target parameters.

UDC 553.982.233

Rostovtsev V.V., Rostovtsev V.N.
ENHANCING GROWTH RATE OF HYDROCARBON RESERVES USING THE INNOVATIVE TECHNOLOGIES (BY THE EXAMPLE OF OMSK REGION)

The authors have analyzed Omsk region oil-and-gas potential based on the data of the innovative technology of quantum-optical filtering. The article introduces physical principles of quantum-optical filtering technology. By the example of Omsk region the efficiency of applying the quantum-optical filtering technology when solving the problems of enhancing growth rate of hydrocarbon reserves is shown.

UDC 543.38:543.51

Duchko M.A., Gulaya E.V., Serebrenikova O.V., Strelnikova E.B., Preys Yu.I.
DISTRIBUTION OF N-ALKANES, STEROIDS AND TRITERPENOIDS IN PEAT AND PLANTS OF TEMNOE BOG

The authors have analyzed the composition and distribution of n-alkanes, steroids and triterpenoids in peat of Temnoe bog at the depth to 265 cm and in the most common marsh plants. The features of transforming the organic substance composition in bog mode as well as the peatforming plant sources were determined.

UDC 556.314

Guseva N.V., Kopylova Yu.G., Soldatova E.A.
MOBILITY OF CHEMICAL ELEMENTS IN WATER–BOTTOM SEDIMENTS SYSTEM

The article considers chemical composition of waters and bottom sediments within Tom-Yaya interstream area. Based on water–rocks balance analysis the geochemical types of waters were distinguished. The authors have analyzed the features of chemical elements behavior in waters and bottom sediments of geochemical types.

UDC 553.98;550.4

Korzhov Yu.V., Isaev V.I., Kuzina M.Ya., Lobova G.A.
GENESIS OF PRE-JURASSIC OIL POOLS OF ROGOZHNIKOVSKAYA GROUP OF FIELDS (BASED ON THE RESULTS OF STUDYING THE ALTITUDINAL ZONALITY OF ALKANES)

The authors have studied the content and composition of alkanes, lithologic features of rocks of Jurassic and pre-Jurassic complexes of North Rogozhnikovskoye and Rogozhnikovskoye fields. Two areas, within which mobile alkanes $C_{9-19(21)}$ are redistributed, have been determined. One of them is composed of upper Jurassic deposits and the second one is composed of the rocks of Middle-Lower Jurassic and Triassic weathering mantle. Directivity of hydrocarbon interstratal migration indicates the Jurassic genesis of oils in weathering mantle reservoirs.

UDC 550.42:552.57

Arbuzov S.I.
THE NATURE OF SCANDIUM ANOMALOUS CONCENTRATIONS IN COAL

The paper considers the nature of accumulation of scandium anomalously high concentrations in coal based on the analysis of features of their distribution in coals and peats of Siberia, Russia Far East, Mongolia, Kazakhstan and Iran. The author has related scandium content in coal to composition of rocks framing coal accumulation basins. The model of accumulation of scandium anomalous concentrations in coal has been proposed. The article introduces the facts of its hydrogenous concentration in coal beds.

UDC 552.57, 552.52, 549.2

Ilyenok S.S.
NATIVE ELEMENTS IN COALS AND COAL ASHES OF AZEYSKOE DEPOSIT OF IRKUTSK COAL BASIN

The native forms of elements occurrence in coals and coal ash of the Azeyskoe deposit was estimated for the first time by scanning electron microscope with energy-dispersion X-ray spectrometer. More than 17 types of native elements as well as intremetallic compounds were discovered. The authors have considered the ratio of elements in coals and coal ash and discussed the conditions of formation of element native forms.

UDC 553.94:550.4(55)

Rybalko V.I.
COAL METAMORPHISM AND ITS INFLUENCE ON TRACE ELEMENTS DISTRIBUTION (BY THE EXAMPLE OF IRAN COALS)

The paper considers the influence of regional and contact coal metamorphism on geochemical spectrum of Iran coal fields. It was ascertained that the processes of regional metamorphism which were considered by the example of middle-Jurassic coal fields of Tabassky basin result in growth of trace elements contents in coal. When studying the contact effect of rock bodies on coal on Sangerud deposit in Elbursk coal basin the coal impoverishment zone by the trace elements was determined. It is measured by the first centimeters. It is shown that metamorphism process is not the determining factor which defines the levels of rare elements accumulation in coals.

UDC 552.5

Pushkareva M.M., Khabarov E.M., Varaksina I.V.
LITHOLOGICAL CHARACTER OF PARFENOVSKIY AND BOTUOBINSKIY PRODUCTION HORIZONS IN VENDIAN OF ANGARO-LENSKAYA STEP AND NEPSKO-BOTUOBINSKAYA ANTECLISE

Based on the results of the carried out investigations the authors have determined the features of composition, structure and formation conditions of botuobinskiy and parfenovskiy horizons of the Upper Vendian in the south of Siberian platform. The comparative analysis was carried out and the influence of sedimentative and post-sedimentative factors on formation of reservoir properties was estimated. It was shown that the rocks of the studied production layers differ considerably in fragmentary material composition and environment. Alluvial and marginal-marine complexes of parfenovskiy horizon are the most varied in rock types. The productive sandstones of botuobinskiy horizon are more uniform in composition; they were accumulated in a large bar system environment. The reservoir formation was first of all conditioned by rock composition and cement type and by grain size and their sorting to a less degree.

UDC 552. 112:550. 842 (571.1)

Stolbov Yu.M., Stolbova N.F.
ESTIMATION OF FLUID MIGRATION INTENSITY OVER THE VANKORSKAYA AREA BY THE RESULTS OF THE APPLIED NUCLEAR LITHOGEOCHEMICAL RESEARCHES OF DEEP WELL LOGS

Fluid migration intensity over the Vankorskaya area was estimated based on the results of the applied nuclear lithogeochemical researches of logs in deep wells drilled in the north-east part of Western Siberia. The investigation of uranium-alumina geochemical balance in core samples allowed estimating the imposed epigenesis intensity in sediments of some suites.

UDC 552.545 + (571.513)

Fedoseev G.S., Blagovidov V.V., Vorontsov A.A., Vishnevskaya I.A.
NEW FINDS OF PALEOTRAVERTINES IN CHEBAKOVO-BALAKHTINSKAYA DEPRESSION OF MINUSA BASIN (WESTERN SIBERIA)

The geological-petrological characteristic of paleotravertines found out in Rodnikovy and Sisimsky areas in Chebakovo-Balakhtinskaya depression of Minusa Basin was given. Their different stratigraphic position in volcanogenic base of Byskarskaya series (D_1) was shown; some lithogeochemical features were noted. The authors determined two-stage formation of travertines with vegetative detritus as one of components in the second stage rocks. The conclusion was made on confinedness of travertines to latent stratigraphic break in Sisimsky cross-section.

UDC 552.543

Lemeshko M.N., Zhukovskaya E.A., Varaksina I.V.
CONNECTION OF OIL-SATURATION OF CARBONATE RESERVOIRS WITH VOIDS FORMATION (BY THE EXAMPLE OF ANCIENT SEDIMENTS IN EASTERN SIBERIA)

Lithogenetic types of Vendian-Cambrian deposits in Ust-Kut horizon of well B were determined and characterized; the conditions for their sedimentation were briefly described; rock oil-saturation was estimated by the results of fluorometric-microscopic analysis. Using the custom-made software «Kern C7» three higher porosity intervals were singled out by petrographic sections. The authors considered the relation of oil-saturation with lithogenetic types of carbonate rocks, reservoir properties and secondary processes of sediment conversion.

UDC 552.54+551.71/72 (571.1)

Tumashov I.V.
LITHOLOGY OF VEND-LOWER-CAMBRIAN SEDIMENTS OF PREDENISEI OIL-AND-GAS BEARING SUBPROVINCE (BASED ON THE RESULTS OF DRILLING THE PARAMETRIC WELLS VOSTOK-1,3,4)

In 2005–2008 in the east of Tomsk region and in the south-west of Krasnoyarsk Territory the parametric wells Vostok-1, Vostok-2, Vostok-3 were drilled. For the first time in Western Siberia, within the Predenisei oil-and-gas bearing subprovince, the wells defined the total paleontological dated section of the Upper Vend and Lower Cambrian. The article introduces the results obtained in the detailed lithological investigations to determine the composition, structure and depositional conditions of the sediments.

UDC 553.411.071.061

Kucherenko I.V.
THE PROBLEMS OF FORMING HYDROTHERMAL GOLD DEPOSITS. P 2. METAMORPHIC AND POLIGENOUS GEOLOGICAL-GENETIC CONCEPTS

The article introduces the analytical data on gold content in black shales of gold-fields published for fifty years. The estimates of gold contents in the same strata in various time have changed from several grams per a ton of a rock to sub-clarkes. The disagreements are conditioned by the use of the methods inappropriate to the aim of the research. The author has proposed the methodology and the methods of petrologic-geochemical research, alternative to the existing ones, which implementation could condition the reconstruction of the geological history of rocks and chemical elements in them. According to the results obtained gold pre-ore contents in black shales in Pre-Proterozoic Mikhaylovskaya, Late-Riphean Kedrovskaya, Vodorazdelnaya, Mukhtunnaya, Khomolkhinskaya, Imnyakhskaya, Aunakitskaya suits in the south-east of mountain folded framing of Siberian craton meet the sub-clarke values (0,5...3,0 mg/t); its higher and high contents in pre-ore area of gold ore fields, including Sukhoy

Log, are of ore origin, i.e. represent the consequence of ore formation but not its reason. The petrologic-geochemical data prove the real-genetic uniformity of near-ore metasomatic, geochemical haloes and gold deposit ores formed in crystal substrate and black shale strata. The data correlate with the facts introduced in the first part of the article on mineralization in one and another substrate at the late basaltoid stage of establishment of antidromic granite-diorite-doleritic fluid-igneous complexes.

UDC 553.411.04/071(571.5)

Kucherenko I.V.
PROGNOSIS-SEARCH COMPLEX FOR METHOTHERMAL GOLD DEPOSITS. P. 2. PETROLOGIC CRITERION

The paper considers the issues of connection between the process of forming hydrothermal gold deposits with magmatism and possibility to use the results of its solution as a predictive criterion. The factual base includes the empirical materials obtained in gold ore fields in south mountain folded framing of Siberian craton formed in crystal substrate and black shale strata. The author substantiates the formation of deposits in both media as a part of antidromic granite-diorite-doleritic fluid-igneous complexes at the late basaltoid stage of their evolution. The developed petrologic criterion is recommended to be included into the structure of prognosis-search complex of gold mineralization.

UDC 552.321.6:553.08

Yurichev A.N.
KULIBINSKY AND NIZHNEDERBINSKY COMPLEXES: PETROLOGO-GEOCHEMISTRY COMMON TRAITS (NORTHWEST OF EASTERN SAYAN)

The author investigated petrologo-geochemical features of kulibinsky and nizhnederbinsky mafic-ultramafic complexes in northwestern part of Eastern Sayan. Their petrographic and mineralogical composition, ore mineralization, petrochemical and geochemical features are shown. The resulted data allowed establishing a strong resemblance of the compared complexes and suggesting a high potential to discover Pt-Cu-Ni mineralization in their ultramafic series.

UDC 552.321.6:553.08

Yurichev A.N., Chernyshov A.I., Kulkov A.S.
ORE MINERALIZATION OF THE AGARDAG ULTRAMAFIC MASSIF (REPUBLIC OF TYVA)

The features of ore mineralization of the Agardag ultramafic massif located in the south-eastern part of the Republic of Tyva are studied. Tipomorfizm and chemical compound of minerals are shown. The resulted data allowed determining the degree of partial melting of the initial substrate and the temperature of its metamorphic transformation when moving and consolidation in the earth's crust. The authors managed to trace the evolutionary direction of change in chemical composition of chromospinelides and associated sulphides. It is determined by the conditions of their depletion in the upper mantle and subsequent metamorphic transformations.

UDC 550.83:551.3

Ustinova V.N., Starikov N.N.
SEISMIC FACIES MODELS OF JURASSIC PRODUCTIVE SEDIMENTS OF PESTSOVOE FIELD

Seismic facies modeling on the Pestsovoe oil-and-gas field was carried out by the results of three-dimensional seismology using the materials of well geophysical investigation and core research data. Seismic structural and lithological models allowed specifying the facial nature of poorly studied and prospectively oil-and-gas bearing reservoirs of Jurassic sediments. Based on the materials of seismic and geological modeling the outlines of paleochannel deposits being the high-output reservoirs on the deposit were traced. The facial type of the productive sediments was specified by the data of lithofacies investigation on well core.

UDC 553.493.5:552.331.4

Korobeynikov A.F., Gusev A.I.
GOLD BEHAVIOR IN MELTS AND THE FEATURES OF ITS FRACTIONATION

The article introduces the data on gold behavior in melts of different silica acidity. Based on the authors' data and the results of the other researchers the main thermodynamic and petrological mechanism of gold behavior in melts was traced. The authors have determined the important role of mode change in melt oxidation-recovery. The role of element separation factor in melt evolution and fractionation is noted. The association of large and giant gold deposits with the regenerated magma formed in contamination of the parent mantle basaltoid magma by carbon crust material is more preferable.

UDC 553.984;552.54

Koveshnikov A.E.
THE INFLUENCE OF HERCYNIAN FOLDING ON OF PALEOZOIC FORMATIONS SAFETY OF WESTERN-SIBERIAN GEOSINECLISE

When analyzing the width of carbonate sediments of Western-Siberian geosineclise the fact of limestone width increase corresponds to three large fragments of pre-Jurassic basement stand out. Probably it is connected with Hercynian orogeny manifestation as the outlines of the singled out areas of limestone width increase have certain parallels with corresponding borders of large tectonic blocks such as Russian platform and Eastern Siberia. These areas may be considered as synclinoriums. Minor width of Paleozoic sediments on adjacent areas is connected with the fact that these are anticlinoriums. At the Hercynian orogeny the Paleozoic sediments here were leveled up and broken considerably by weathering processes during the continental period of the region development. These anticlinoriums are formed by rocks transformed significantly by the processes of progressive epigenesis. The Paleozoic sediments within synclinoriums during the Hercynian orogeny were slightly leveled up and slightly transformed by the processes of regression epigenesis.

UDC 553.984;552.54;551.253

Koveshnikov A.E.
THE INFLUENCE OF PROGRESSIVE, REGRESSIVE EPIGENESIS, HYPERGENESIS, SECONDARY CATAGENESIS ON FORMATION OF RESERVOIR ROCKS IN PALEOZOIC SEDIMENTS OF WESTERN-SIBERIAN GEOSINECLISE

Paleozoic sediments at formation and further transformations changed in several stages: diagenesis and progressive epigenesis (catagenesis); Hercynian orogeny and regressive epigenesis of a part of sediments; orogenesis and weathering mantle formation; regressive epigenesis of secondary putting down stage or secondary catgenesis with formation of fracture hydrothermal-metasomatic rock-reservoirs. Each stage is characterized by features of occurrence influencing in a different way on final formation of reservoir rocks in Paleozoic formations and oil and gas deposits connected with them.

UDC 550.42:577.4 (571.1)

Savichev O.G., Phung Thai Duong
ZONE LAWS OF CHANGING CHEMICAL COMPOSITION OF RIVER SEDIMENTS IN SIBERIA AND ITS FORMATION CONDITIONS

The authors have analyzed the geochemical data on a chemical composition of river sediments of small and average rivers of Siberia within tundra, forest-tundra and taiga zones. The average values of concentration of 21 chemical elements were received. It was ascertained that the content of the majority of the investigated chemical elements grows from tundra up to taiga. The highest concentrations of the majority of the investigated elements in tundra are in soils and in taiga they are in river sediments.

UDC 624.131

Fi Kh.T., Strokova L.A.
PREDICTION OF LAND SUBSIDENCE DUE TO GROUNDWATER EXPLOITATION IN HANOI (VIETNAM)

Multifactorial correlation analysis is a new method used to predict the land subsidence due to groundwater exploitation. The article introduces and applies the method to establish the function of the average surface settlement rate (V_s) and the function of the time-dependent surface settlement (S_t) due to groundwater exploitation in areas of Phap van, Luong yen and Thanh cong in Hanoi. The comparison with the actual monitoring data indicates that the prediction results are relatively close to the monitoring. The authors can conclude that multifactorial correlation analysis is a reliable method to predict the land subsidence due to groundwater exploitation in Hanoi.

UDC 550.42:577.4(571.1)

Savichev O.G., Guseva N.V., Kupriyanov E.A., Skorokhodova A.A., Akhmed-Ogly K.V.
CHEMICAL COMPOSITION OF WATERS OF OBSKOE BOG (WESTERN SIBERIA) AND ITS SPATIAL CHANGES CONNECTED WITH POLLUTION

The authors have analyzed chemical composition of Obskoe bog waters (Western Siberia). The data on average concentrations of the main ions, microelements, biogenic and organic substances in natural and polluted bog waters, ground and river waters in Obskoe bog area were received. The criteria of bog water pollution were stated. Three groups of substances with various character of spatial change of concentration were revealed with distance from waste issue. It was shown that mineralization and contents of organic and biogenic substances decrease to initial values in the area of 600 m width from the bog border.

UDC 631.811.944:631.445.12

Arkhipov V.S., Bernatonis V.K.
CALCIUM AND IRON DISTRIBUTION IN VERTICAL PROFILE OF PEAT BEDS IN WESTERN SIBERIA TAIGA ZONE

The authors have studied the calcium and iron joint distribution over the depth of peat beds in bogs of Western Siberia. For this purpose 1410 peat samples were collected in 17 bogs of Western Siberia taiga zone. Calcium and iron content in the samples were determined by the method of neutron activation analysis. The curves of elements layered distribution were plotted. It was ascertained that calcium and iron were accumulated simultaneously in the dividing occurrence bogs. In low-level bogs of river valleys in Ob basin calcium and iron were accumulated separately; it affected the forms of layer-by-layer curves.

UDC 622.232.72

Fedin D.V., Shadrina A.V., Saruev L.A.
ESTIMATION OF THE EFFICIENCY OF IMPACT TRANSFER TO CRUSHABLE GRANITE AT ROTARY-PERCUSSION SLIM HOLE DRILLING

The article introduces the experimental results of the required parameters of striker impact with the liner of drilling string (50 m in length) to obtain peak velocity of slim hole drilling in granite at minimum power consumption.

UDC 62–522.2

Fedin D.V., Saruev L.A.
THE DEVICE FOR PULSE ENERGY REGULATION IN HYDROIMPULSIVE MECHANISM OF ROCK DRILL

The authors introduce the method of controlling energy of hydroimpulsive mechanism for drilling earth slim hole used when driving different strength rocks.

UDC 622.243.2

Neskoromnykh V.V.
THE ANALYSIS OF ROCK ANISOTROPY INFLUENCE ON WELL DEVIATION AT THEIR MECHANICAL AND THERMAL BREAKDOWN

The article considers the principle laws of forming the mechanical tension field in anisotropic rocks at mechanical breakdown while drilling and thermal energy distribution field at thermomechanical or thermal drilling, for example by rock melting. It was shown that the asymmetrical shape of the field of voltage distortion and distribution in layered rock is formed under rock mechanical breakdown while drilling. The rock is deformed to a greater degree perpendicular to layers arrangement. As a result of rock nonuniform distortion and subsequent destruction the conditions for overturning moment and well consequent deviation occur. When heating the rock the temperature field is developed more actively along the layering in comparison with the direction perpendicular to the rock layers. It was shown that due to the different directions of the deformation rock and thermal energy distribution of deviations well drilled mechanically and thermally is bidirectional. At thermal mechanical destruction of rocks the effect of direction compensation of nonuniform destruction is possible and therefore the well deviation is possible to be decreased.

UDC 622.24

Neskoromnykh V.V., Borisov K.I.
ANALYTIC STUDY OF ROCK CUTTING-SHEARING BY A BIT WITH PDC CUTTERS

The article considers the current issues of interaction of modern PDC rock-breaking tool cutters with a rock under steady state conditions of its cutting-shearing. The authors have determined the features of influence of geometry, arrangement and dynamic of PDC cutters on rock failure when drilling wells. Based on the results of theoretical and experimental investigations the authors have stated the offers on the important aspects of PDC bit design optimization.

UDC 622.243.063

Neverov A.L., Rozhkov V.P., Batalina L.S., Mineev A.V.
THE INFLUENCE OF SINGLE SALTS ON RHEOLOGICAL FEATURES OF POLYMER FLUIDS WHEN DRILLING BY SSK COMPLEXES IN ARGILLACEOUS DEPOSITS

The article is devoted to the research of single salts influence on rheological features of acrylic anionic and cationic polymers with molecular mass from 5 to 22 million units and charge density 20...46 %. It was shown that salting-out effect may be estimated by the change of rheological features on a rotation viscosimeter with a great number of rotation speeds.

UDC 622.02

Shmurygin V.A., Pankratov A.V., Lukyanov V.G.
THE TECHNIQUE FOR CALCULATING PENETRATION RATE OF PROSPECT HOLES CONSTRUCTED BY EACH TUNNELING COMPLEX AT ONE- AND MULTI-HOLE WORK

The paper considers the issues of the efficient use of the expensive mobile equipment, rate of plate advance of the main mining, flowcharts at exploration.

UDC 622.24

Borisov K.I.
THE DEVELOPMENT OF SCIENTIFIC BASE FOR DESIGNING POWER CHARACTERISTICS OF THE DOWNHOLE DRILL MOTORS TO WORK WITH PDC DRILL BITS

The paper considers the topical issues of designing characteristics of high-torque downhole drill motors to work with modern rock-breaking tools of PDC type. Based on the results of theoretical and experimental investigations and the analysis the author has determined the

objective relation of complex resistance factor to cutting K_{rs} in volume mode of rock dynamic cutting and the index of specific torque on a drill bit *m*, being the base for calculation of torques in extreme operation modes of downhole drill motors. The index K_{rs} is proposed to be used when designing optimal power characteristics of the hydraulic downhole drill motors operating with modern cutting-shearing tools.

UDC 004.932

Nemirovsky V.B., Stoyanov A.K.
SEGMENTATION OF COLOR IMAGES OF NATURAL OBJECTS BY RECURRENT NEURAL NETWORK

The authors consider the possibility of applying the recurrent neural network for segmentation of full-color images of natural objects on the basis of color component clustering. The issues of multistage segmentation of such images in different color models are discussed. The paper introduces the experimental results on multistage segmentation of natural object images in RGB и YUV color spaces.

UDC 621.643

Mamonova T.E.
THE TECHNIQUE OF DETERMINING LOSS IN A PIPELINE BASED ON PRESSURE TIME DIFFERENCE

The author has proposed the technique for determining loss based on the analysis of pipeline hydraulic characteristics in time. The paper introduces the design formula for determining mass flow and loss coordinates and the study of the technique with COMSOL Multiphysics 3.5 application. It is shown that the proposed technique and the design formula corresponding to it are applicable when determining short-time losses.

UDC 581.256.3:504.5:502.51:546.36*137(472.2+470.333)

Dayneko N.M., Timofeev S.F.
ACCUMULATION OF RADIOCAEZIUM AND HEAVY METALS IN RIVERAINE–WATER VEGETATION IN SOME AREAS OF GOMEL REGION (THE REPUBLIC OF BELARUS) BORDER WITH BRYANSK REGION OF RUSSIA

Radiologic analysis of water and soil samples has shown that radiocaezium content does not exceed the assigned standards. ^{137}Cs accumulation over the permissible level was determined in bottle brush, common loosestrife, marsh cinquefoil, marsh sedge and fox sedge, common rush, water parsnip, marsh woundwort, bird vetch and clustered dock. Chemical analysis of water samples found out copper accumulation 6–10 times over the maximum permissible concentration. Heavy mental content does not exceed the maximum permissible concentration in all land and soil samples. Copper and zinc contents were higher than background one and lead and cadmiums content were lower than the background one in all plant samples.

UDC 550.834 (911.2)

Ustinova V.N., Ustinova I.G., Ustinov V.G., Starikov N.N.
PROBABILISTIC MODELS OF ECOLOGICAL SYSTEM CYCLIC DEVELOPMENT

The article is devoted to the research of cyclic development of the world ecosystems and the study of climate simultaneous change. In the history of development of geologic systems the recurrence, renewability of the processes of sedimentation, tectonic activity and climate were detected. Multi-ordinal cyclites are found in geological systems. The alternation of rocks in them is the change of conditions for sediment and temperature mode formation. Temperature changes are closely related to changes in solar activity. The study of solar activity reveals the gravitational effect of solar planets in the system mode of its variability. Trending variability of solar activity helps to clarify the frequency of climate variability and to find the reasons of temperature change.

UDC 55–057.4:658.562.012.7

Mazurov A.K., Bolsunovskaya L.M.
GEOSCIENCES: THE FEATURES OF ACCREDITATION, CERTIFICATION AND LICENSURE IN THE ADVANCED COUNTRIES

The authors have described the system of accreditation, certification and licensure of geological section specialists in the advanced countries (the USA, Canada, Australia, Great Britain) and have studied their experience. The conclusions were made that the system of accreditation, certification and licensure in geosciences in Russia may be the quality assurance both on the national and international levels.